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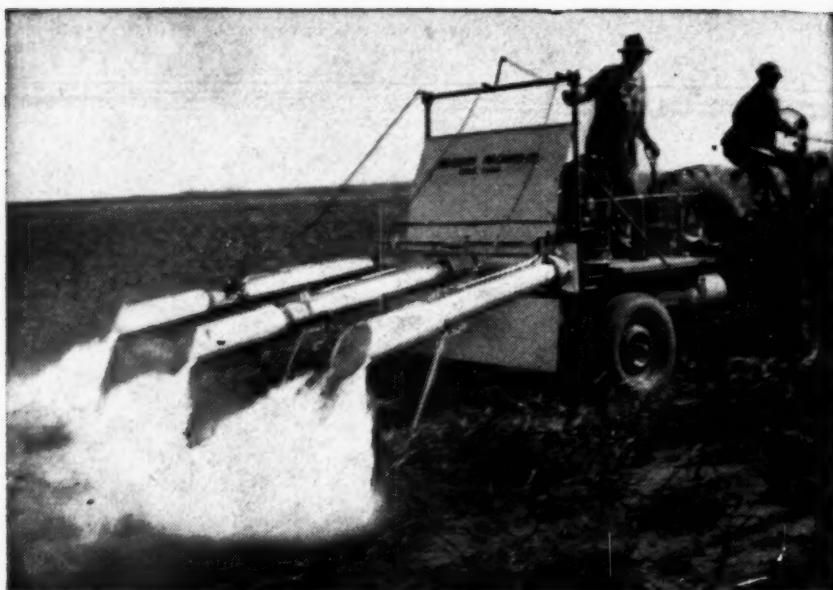
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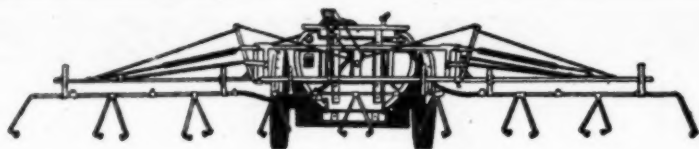
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WEED CONTROL IN POTATOES WITH 2,4-D

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In recent years, selective chemical weed killers have been used extensively to control weed growth in crops. Crafts, A. S. (1) enumerates the factors governing the selective action of different types of chemical herbicides. These include, in addition to such morphological features as leaf structure and arrangement, properties apparently inherent in the plant. There are three groups of selective herbicides: the dinitro compounds, the selective light oils, and the growth-regulating compounds.

The possibility of using synthetic growth-regulating compounds in a herbicidal role was first investigated in England in 1942, and in the United States in 1944. Since then more than a thousand such compounds have been tested at Camp Detrick, Maryland (5). Of these 2,4-

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dichloro phenoxyacetic acid, or 2,4-D, in various formulations including the methyl, ethyl, and isopropyl esters, amine salts and sodium salt, has received the most attention. Its use has been widespread in the control of turf and lawn weeds since 1946; it has been the subject of constant experimentation in weed control in crops, particularly the cereal grains, which appear to be comparatively resistant to its action.

A comprehensive list of weeds and crop plants and their reaction to 2,4-D is included in the Report of the North Central States Weed Control Committee, 1946 (4). Potatoes are herein reported as intermediate in their resistance to 2,4-D. Ennis *et al* (2) studied the effects of several growth regulating compounds on Irish potatoes, and found that 2,4-D applied at the rate of 8 mgms. per 6" pot had no adverse effect on Irish potatoes. They suggested the use of 2,4-D to control weeds in potato crops.

It is generally accepted that cultivation of the potato crop should cease when the plants are in full bloom. Any tillage after this time results in root pruning and consequently a reduction in yield. However, under Ontario conditions many broad-leaved annuals if not removed later in the season grow to a gigantic size. To destroy these weeds in the potato rows requires hand hoeing—an expensive type of cultivation. The presence of these weeds, particularly in the potato rows, gave rise to the idea of using a selective herbicide.

MATERIALS AND METHODS

1946—Small scale preliminary tests were conducted to determine the response of potatoes to 2,4-D. The plots were sprayed with aqueous solutions of the triethanolamine salt of 2,4-D at concentrations of 500, 750, and 1,000 p.p.m. at rates equivalent to 0.8, 1.2, and 1.6 pounds of the free acid per acre. Day temperatures immediately before and after spraying ranged between 75° and 85°F; night temperatures, between 50° and 60°F. Twenty-four hours after spraying 0.83 inches of rain fell.

A slight yellowing of foliage accompanied by epinasty of the new growth resulted from the spray. Within three weeks the sprayed plants had recovered completely. Statistical analysis revealed no reduction in yield or in quality of the tubers. It was decided, therefore, to carry out more extensive tests in 1947.

1947—Tests were carried out on land which possessed a well-established weed population. A crop of winter rye fertilized at the rate of 500 pounds per acre of 4-8-10 fertilizer was plowed under in preparation for the potato crop. Katahdin potatoes were planted on the 11th of June with an application of 1,000 pounds per acre of 4-8-10 fertilizer.

Plots consisted of six 20-plant rows in 5 randomized replicates. For yield tests, rod-length sections of the four middle rows were taken.

The randomized plots received the following treatments:—

- A—Cultivation up to blossoming + ridging + spraying on the 18th of July with an aqueous solution of the triethanolamine salt of 2,4-D at 750 p.p.m., 1.2 pounds free acid per acre. No cultural weed control after ridging.
- B—Cultivation up to blossoming + ridging + spraying on the 18th of July at 1000 p.p.m., 1.6 pounds free acid per acre. No cultural weed control after ridging.
- C—As for A, but sprayed on the 29th of July.
- D—As for B, but sprayed on the 29th of July.
- E—Cultivation + ridging + hoeing after ridging.
- F—Pre-ridging cultivation, but no ridging and no subsequent weed control.

A 4-gallon knapsack sprayer developing a pressure of *circa* 50 pounds was used in these experiments.

At the time of the first spraying, the 18th of July, the potatoes were about 12 inches in height. The temperature was 78°F. About three hours later a shower of 0.19 inches of rain fell which caused the temperature to drop. The mean temperature on the following day was 59°F. After this date, normal July weather prevailed—day temperatures of 75° to 80°F; night temperatures 50° to 60°F. There was a heavy infestation of the following annual weeds, mostly 6" or under in height: *vis.* Lamb's Quarters, (*Chenopodium album*); Pigweed, *Amaranthus retroflexus*; Ragweed, (*Ambrosia artemisiifolia*); and Foxtail, (*Setaria viridis*).

By the 29th of July the weeds in unsprayed plots were as high as the potatoes. Temperatures at this time were normal, and no rain fell.

The results of these sprayings were striking. No damage to the potatoes could be detected. All weeds, except the resistant Foxtail, showed typical symptoms of injury within a few days of spraying. On the 1st of October, when the potatoes were harvested, sprayed plots were still completely free from the broad-leaved weeds.

An analysis of variance and co-variance was made on plot yields. Specific gravity and cooking tests were conducted on composite samples after the potatoes had been stored at room temperature for one month. The results of these determinations are given in table I.

LARGE SCALE TESTS

The results of the plot test were so encouraging that it was decided to spray a 4-acre block of Katahdin potatoes, and a small section of

TABLE I.—*Katahdin Variety*

Treat- ment	Mean Yield Bus. per Acre	Mean Yield of Treatments Ex- pressed as Per cent of General Mean	Per Cent No. 1 Potatoes	SPECIFIC GRAVITY TESTS		COOKING TESTS			
				Dry Matter	Starch	Appearance	Mealiness	Flavor	Total
A	214.06	107.2	85.6	18.3	14.5	16	34	33	83
B	184.62	92.5	85.2	18.3	14.5	17	35	33	85
C	218.24	109.3	90.3	18.3	14.5	15	30	33	78
D	201.59	101.0	88.7	18.3	14.5	17	29	32	78
E	187.04	93.7	87.5	18.3	14.5	18	37	31	86
F	192.54	96.4	87.5	17.4	13.9	15	31	34	80
G. M.	199.68								

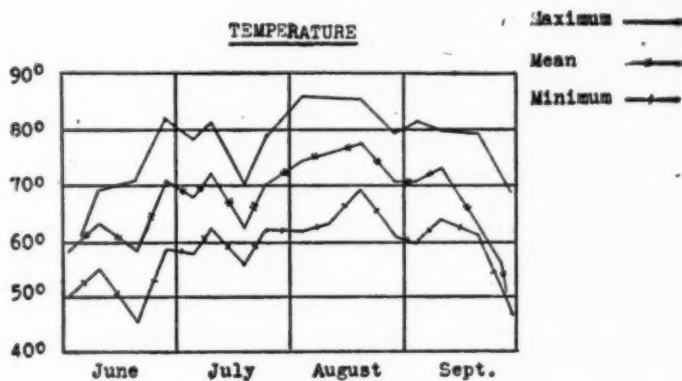
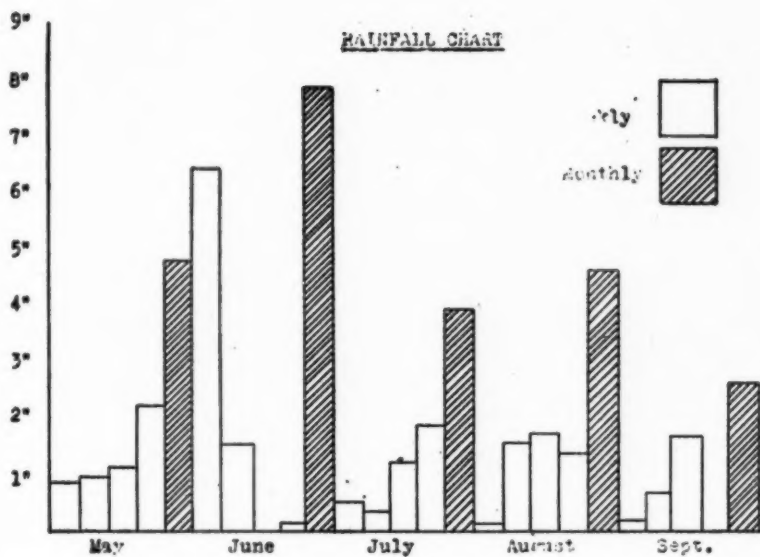




FIG. 1. Section of field of Katahdin potatoes one week after spraying with 2, 4-D at 750 p.p.m., 1.2 pounds of the free acid per acre. Weed on left showing typical 2,4-D injury is Pigweed (*Amaranthus retroflexus*); weed on right, Lamb's Quarters (*Chenopodium album*). No injury to potato foliage is evident.



FIG. 2. Photo of section of Irish Cobbler potato field taken three days after spraying with 2,4-D at 750 p.p.m., 1.2 pounds of the free acid per acre. Injury from spray is indicated by chlorotic foliage in the middle. Vines in background were not sprayed.



FIG. 3. Field of Katahdin potatoes taken one week after spraying. Left—Sprayed with 2,4-D at 750 p.p.m., 1.2 pounds of the free acid per acre. Right—Unsprayed.

Irish Cobbler. This was done on the 9th and 13th of August, when the potatoes were in bloom. Weeds at this time stood well above the potato plants. An ordinary potato sprayer developing 250 pounds pressure was employed. An aqueous solution of the triethanolamine salt of 2,4-D was applied at the rate of 1.2 pounds of the free acid per acre.

OBSERVATIONS AND DISCUSSION

Within two days of spraying all broad-leaved annual weeds in the sprayed block showed symptoms of 2,4-D injury. A week after spraying no weeds were visible above the potatoes. (See Fig. 3) The completeness of weed control was somewhat surprising, inasmuch as weeds are generally regarded as developing an increased resistance to 2,4-D spray as they approach maturity.

Response to 2,4-D was noticeably different in the two varieties. Katahdin and Irish Cobbler. There was no damage to the vegetative portions of the Katahdin, although the flowers were destroyed. The foliage on the Cobbler, however, turned yellow within 3 days after spraying, and the plants died within 10 days. This differential response might be attributed either to varietal characteristics or to the stage of maturity.

The Cobbler, an early maturing variety, was within 2 weeks of maturity when sprayed; Katahdin lacked 4 weeks of being mature.

The Cobbler variety, in 1947, exhibited similar injury to that suffered by the Katahdin in 1946, but to a much greater degree. In the 1946 plots the injury consisted of a mild chlorosis and epinasty of the younger leaves with subsequent recovery. There was no decrease in yield. The Katahdin variety was sprayed at the same stage of growth in both seasons. The reason for this difference in response could be seasonal. Conditions of temperature and moisture which are favorable to photosynthesis appear to favor effective action of 2,4-D (6) whereas very low temperatures retard its herbicidal action (3). Weather conditions in both 1946 and 1947 should have been favorable to rapid action of 2,4-D. The results of the two years' tests indicate that further work on varietal and seasonal response would be of benefit before general recommendations can be made.

RESULTS OF ANALYSIS OF VARIANCE ON SMALL PLOTS (TABLE I.)

The coefficient of variation of the experiment is very high, 18.4 per cent; hence no significant differences in yield between treatments are apparent. It cannot be stated, therefore that any treatment was definitely beneficial or detrimental. However, it is to be noted that mean yields of plots sprayed at 750 p.p.m. were higher than the general mean. Those receiving no spray were below the general mean. The fact that the mean yield of plots in which weeds were allowed to grow unchecked was higher than the two means of treated plots is significant. There was a plentiful supply of moisture throughout the growing season, and water should not have been a limiting factor in the growth of either potatoes or weeds; an adequate supply for both was probably available. Similarly competition for nutrients should not have been serious, in view of the application of fertilizer. The inference might be made that under fertility and moisture conditions obtaining in this experiment, the presence of weeds did not significantly reduce the yield of tubers.

Specific gravity and cooking tests revealed no wide variation in quality among the potatoes which received the different treatments.

COST OF SPRAYING

These tests show that the cost of materials for spraying an acre of potatoes was approximately \$3.20; and the cost of hoeing an acre of potatoes with a similar infestation of weeds, approximately \$9.00. The cost of application would be completely eliminated if the 2,4-D could be incorporated in the regular spraying or dusting program.

SUMMARY

- (1.) 2,4-D spray, applied at the rate of 1.2 pounds of the free acid per acre, gave excellent control of the annual broad-leaved weeds in potatoes.
- (2.) No detrimental effect on yield or quality of tubers of the Katahdin variety was found in either 1946 or 1947.
- (3.) A difference in varietal and seasonal reaction to 2,4-D was apparent. In 1946, the Katahdin variety showed damage to floral parts and mild chlorosis of the new growth. These plants recovered from the chlorosis. In 1947, the Katahdin variety showed damage to floral parts, but no damage to foliage, whereas the Cobbler variety developed severe chlorosis, and matured without indication of recovery.
- (4.) The cost of spraying would be decreased if the 2,4-D could be incorporated in the regular potato sprays or dusts.
- (5.) Further work on varietal response is necessary before general recommendations for the use of 2,4-D in weed control in potatoes are made.

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WHAT'S AHEAD FOR THE POTATO INDUSTRY

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The potato industry is at a cross road in its development due to the gradual but steady decline in per capita consumption and the rapidly rising increase in per acre crop yield. In addition, the industry is affected by the many influences related to the end of the war as well as by the special conditions resulting from the fact that potatoes have served as a "guinea pig" in the operation of the Steagall price support program. Thus an analysis of the trends affecting this important commodity must include important longtime factors as well as those of a more temporary character.

Time will not permit considering many important phases which should be included in any complete discussion of this subject. Among these we might include a wide variety such as certified seed, fertilizers, insecticides, fungicides, improved production practices and many other related subjects. Without ignoring the importance of these factors on the broad future of the potato industry, it will be necessary to limit this discussion to a few of the more important features which relate directly to the economic phases of the potato problem.

Probably the most important single question which should be of concern to potato growers is "How large a consumer market do we have for our product?" Producers cannot ignore the fact that the white potato is one of the few fruit and vegetable commodities which is experiencing a steady decrease in consumption per capita. The average per capita consumption during the five years from 1930-1934 was 138 pounds, from 1935-1939 was 131 pounds, and from 1940-1944 was 129 pounds. The revised consumption for 1946 was 122 pounds and the estimated figure for the current season is 125 pounds.

On an "apparent consumption basis" it would appear that from 285 to 290 million bushels will be sufficient to meet domestic consumption requirements, to which should be added 15 million bushels for exports and normal processing and from 35 to 40 million bushels for use as seed for the succeeding crop. This should indicate that the actual quantity of merchantable potatoes needed to meet present commercial requirements will vary from 335 to 345 million bushels, or an average of about 340 million bushels.

¹Director.

²Presented at the Annual Meeting of the New Jersey State Potato Association, Trenton, N. J., Jan. 29, 1948.

Now let us check this figure from another approach, that of actual total production less government purchases for support purposes, which indicate the volume of production needed to meet commercial requirements.

Crop of	Total Production (Million Bushels)	Government Purchases ¹ (Million Bushels)	Production for Com- mercial Uses. (Million Bushels)
1943	465.0	24.9	440.1
1944	383.1	3.1	380.0
1945	418.0	27.5	390.5
1946	484.2	98.4	385.8
1947	384.4	21.0 ²	363.4

¹Purchases plus other quantities handled.

²To January 17, 1948.

We all recall that the support program for the 1943 crop season was not successful in maintaining the support price and that much of the surplus was not removed from the market that year. However, it is most interesting that during the four seasons since the production needed for commercial use has varied from 363 to 390 million bushels, approximating an average of close to 380 million bushels for each of the four seasons.

From these rather simple calculations it would seem that we might reach the conclusion that *current market requirements* for consumption, exports, and seed approximate 340 million bushels and that an *average production* including shrinkage of about 380 million bushels has been used during each of the past four seasons to furnish such market requirements. Either of these figures would seem to be a fair measure of the present market for potatoes in the United States.

Perhaps next in importance is the question, "How many potatoes are we growing?" The figures quoted above give the total production for each of the past five seasons. Now let us consider what they represent from the standpoint of acreage and yield per acre.

Undoubtedly, the most startling fact disclosed by these figures is the fact that the yield per acre of the past two seasons has been 50 bushels above the ten-year average, and more than 40 bushels above any other year except 1945. If the upward rise of per acre yield attained

Average	Harvested Acreage (Thousands)	Yield (Bushels)	Total Production (Million Bushels)
1936-1945	2,862	132	376
1941	2,711	131	356
1942	2,706	137	370
1943	3,331	140	465
1944	2,922	131	383
1945	2,606	155	418
1946	2,599	186	484
1947	2,112	182	384

during the past three years continues and becomes permanent, then we must anticipate substantial changes in the potato production picture.

Although the national acreage goal for 1947 was 2,517,000 acres, the actual acreage harvested was estimated to be 2,112,000 acres. Yet this acreage, the smallest harvested since 1881, was sufficient enough to produce a surplus of at least 21 million bushels. If the average yield for the entire country should rise to 200 bushels per acre, as some persons are predicting, then it would be necessary for the acreage to drop to approximately 1,900,000 acres, or about 10 per cent below the 1947 acreage.

With the end of the Stegall price support only a few months off unless Congress takes action, growers need to face realities and to lay plans now to maintain the potato industry on an even keel and to keep it there. The Steagall Amendment was enacted to protect growers who responded to the nation's wartime need against serious price declines during the war or post-war periods if an excess supply resulted. Throughout this period the country had ample supplies of potatoes and the 1943 and 1946 crops were of record volume. The 1947 acreage was largely limited by allotments to each grower, which it was necessary to adhere to if the grower was to be eligible for the support program. A similar program is expected to be in effect in 1948.

Even though these programs have been subject to some criticism in the press, those who have done so have failed to appreciate that it

was far better to be concerned with problems of surplus disposal rather than those of shortage which the potato industry has not experienced since the 1941 crop. Obviously, the Steagall programs designed for war production cannot be expected to be continued during peacetime and so the industry should be considering a more permanent basis for meeting such situations in the future.

First in importance would seem to be the stabilization of acreage at that amount which will produce an adequate supply with as little surplus as possible above the actual needs. High yields per acre should be encouraged so that low cost production will be secured. Every effort should be made to avoid the alternate fluctuations of acreage which have been so common in the past and have been one of the causes of periods of surplus and scarcity of this commodity. If the increase in per acre yields continues, it will be necessary to make further reductions in acreage unless there is a considerable increase in consumption.

Next in importance should be to increase potato consumption. A lowering of price to consumers will not result in materially increased consumption of white potatoes, because the demand for potatoes is inelastic except at extremely low or high price levels.

The most promising method for increasing consumption would seem to be a substantial improvement in the quality of the potatoes marketed. Although there is great need for further research on this subject, it seems that consumption could be enlarged considerably if the consumer is offered a good quality of potatoes at all times, which obviously is not the case now.

The substantial shift in certain producing districts to red varieties emphasizes the demand for a better quality of potatoes. At least a portion of the shift of acreage to the irrigated areas from other producing districts reflects the same desire for superior potatoes, especially those which are well adapted for baking purposes. There is much to be done to provide new varieties which will be more suited to production and consumption needs.

The industry must do more in advertising and sales promotion if it is to widen its consumption outlets. This will probably be more difficult in the case of potatoes than with most commodities of a similar character, although the product has many selling points such as the considerable quantity of Vitamin C which is contained in the average serving of potatoes.

Another most necessary step is to improve potato grading. After thirty years of use there is still need for improvement in the actual use of the U. S. grades. The recent establishment of optional U. S. grades

for consumer packages should afford an opportunity to carry out a practical test of these more strict grades with consumer packages.

However, there is still much to be done before the industry can claim that it is doing a good job of grading. In fact, in some areas the reverse is actually the case. During the past season some producers in one state protested against the use of the U. S. grades in a marketing agreement program because it prevented them from shipping the cull potatoes of which they had an abundance. It hardly need be stated that the quotations on potatoes from that state have been among the lowest in the country.

Washing and brushing are closely related to grading, although they technically are not necessary to meet the primary grade requirements. However, they do improve the appearance and salability of the stock materially. Perhaps the best indication of the value of washing and grading can be emphasized by the fact that such preparation brought South Carolina potatoes to a competitive price basis with California in the New York market last spring.

After doing all that is possible to stabilize acreage and to grow the varieties desired by consumers, Nature will still have much to say with regard to the size of the final crop and whether any surplus may prevail. Once the crop is produced, the sensible procedure would seem to be to determine what proportion might be considered to be surplus in a producing district, and to take steps to keep that unneeded volume off the market.

The most permanent and practical method for such actions would seem to be the development and use of a marketing agreement program which would permit the industry to withhold the lower grades from market when they are not needed. Although such a program is conducted under government supervision, it is actually administered and operated by the industry itself. One special advantage is that regulations recommended by the industry committee can be varied from time to time and thus have flexibility which permits adjustment to meet changed conditions. Enforcement is handled by the Department of Agriculture through the Department of Justice. Since the Marketing Agreement Act of 1937 was established by Congress and the basic court decisions supporting it were rendered, there has been little delay in securing adequate enforcement in the Federal Courts.

After fully considering all possibilities which might be utilized in solving the potato problem, representative groups within the American Farm Bureau Federation recommended that the regional marketing agreement approach be used as a long-time program for potatoes, with the addition of the acreage allotment method during the remainder of

the Steagall period when the 90 per cent support provision was in effect.

In addition to its advantage with regard to the restriction of grades and sizes, a marketing agreement is authorized to include an industry program for the handling of surpluses or for diversion to other outlets. Thus, when desired it can provide the machinery for improving the grade of product offered to the market, for withholding the balance of the crop from marketing, and can provide for its diversion to other outlets under a surplus program, all under industry rather than government operation.

Having recommended such marketing agreement programs for potatoes, the American Farm Bureau Federation has actively endeavored to get them organized and in operation. In addition to the previous programs, new ones have been added so that the present situation is as follows: Marketing programs are now in effect and can be operated as the industry desires in Michigan, Wisconsin, Minnesota, North Dakota, Colorado, and Idaho. A program applying to Oregon and northern California can be restored for next season in that territory, and a new one is about ready to be formally established in South Dakota. Hearings have been held applying to Nebraska, Wyoming, South Carolina, North Carolina, Virginia, and Maryland and a substantial proportion of these areas is expected to complete agreements before the 1948 crop is marketed. If so, this will leave southern California, Washington, and the northeastern states as the only important areas which have not taken definite steps for 1948. The latest information is that Maine is actively considering an agreement at this time for the 1948 crop. If so, the only important intermediate and late-producing area which is not endeavoring to work out such a marketing program will be New York, Pennsylvania, New Jersey, and adjacent states.

Some consideration has been given to the development of a marketing program for this area but without tangible results to date. Several reasons have been stated for not establishing such a program. Among these arguments is that such a program cannot be operated close to market although it is a matter of official record that in 1946 New Jersey shipments were destined for 25 states in addition to New Jersey ranging from Maine in the northeast to Alabama, Tennessee, Kentucky, Illinois, and Wisconsin on the west, whereas Long Island shipments went even further into Louisiana, Mississippi, Oklahoma, and Missouri.

Another reason stated is that grade regulations cannot be effectively used in a territory where potatoes are harvested as early as possible. At the most, this would only be plausible at the time of the initial digging and would cease to be of importance if agreements prove workable in the southern states. In quite a few commodities the results

achieved through agreements have been to require products to meet minimum standards of maturity for the common good of grower, distributor, and consumer. It is possible that experience might prove that every one would benefit if the harvest of "feathered" and immature potatoes were stopped as has been found with other commodities.

Another reason given for unwillingness to attempt a marketing agreement is the fact that enforcement would be more difficult close to consuming centers. That is true, but if the industry in the commercial shipping areas of these states really wants to make a marketing agreement work they can do so because they will be the ones who will profit from it.

A still further reason frequently suggested is that such a program should be acceptable if all parts of the country would be required to comply. Not only is the provision of the law regional in character, but the economic facts are the same. For example, at the present time there is a very short supply of potatoes in the western part of the country where even culls are being marketed at good prices while it is necessary to support the price of U. S. No. 1 stock in Maine. Next year the reverse of this situation may be experienced. A further reason often given is that all growers should be required to comply whether they are of commercial or non-commercial character. Actually, commercial growers are the only ones who have a financial stake in the future of the potato business and they are the ones who will benefit primarily by grade restrictions. In addition, it will be feasible to police a few commercial counties in a state where potato production is a major activity, although it would be difficult, if not impossible, to cover a wide area where it is a minor crop.

The effectiveness of a grade restriction program will be improved if facilities are available to process lower grade and surplus potatoes into other products such as starch, livestock feed, flour, alcohol, etc. This would especially be true if outlets might be developed which would provide a financial return in excess of the cost of processing.

Research is now in progress which it is hoped may result in the more efficient manufacture of by-products. The most recent report of the Bureau of Agricultural Chemistry just issued contains the following tentative conclusions on this work: "Correlation of available data on the feeding value of dried potatoes for cattle, sheep, and hogs showed that, in general, they can be considered to have a value of about nine-tenths that of No. 2 yellow corn. On this basis, and at an estimated cost of \$23 per ton for processing the potatoes, the net income from sale of dried potatoes for feed in competition with No. 2 yellow corn at \$2

a bushel would be enough to permit the payment of about \$8.75 per ton for raw potatoes delivered at the factory and to give a return of 10 per cent on the investment."

If this development is successful, it should do much to improve the grade of potatoes placed on the commercial markets of the country. In the meantime, growers and shippers have a direct interest in providing facilities for such processing. In addition, to the direct advantage of improving their own pack, they will be doing their part in removing the surplus or lower grades from the market and making a more permanent and stable price structure. May I call your attention to the fact that the fruit industry has done this many years ago, as has certain portions of the vegetable industry. But only in Maine, Idaho, and a few other local areas do we find that the potato industry has developed such facilities for its own use, which it should have done long ago.

One other step which the industry must take is more aggressive merchandising, especially when supplies are large. If the present decline in per capita consumption can be stopped and turned to an expansion, it will immediately increase the portion of the crop needed for food purposes. Each pound of per capita increase reflects a national total of $2\frac{1}{3}$ million bushels, so that an increase of 4 pounds would approximate an increase in market outlet of 10 million bushels.

Few persons within the industry would contend that a good job of merchandising has been done with this commodity. The failure to grade properly, to sell aggressively, and to give consumers a dependable and uniform product at all times need to be corrected. The grower and the shipper must recognize that it is their primary responsibility to produce, grade, and package potatoes which will encourage repeat sales and increased consumption. If and when they have done this, then, and only then, do they have a right to insist upon full cooperation by wholesalers and retailers in aggressive merchandising.

There should be a recognition by the industry that most of the shift in production has been to areas such as Maine, Idaho, Colorado, and southern California which have been paying particular attention to the grading, marketing, and advertising of their product. They have been able to expand in part because they have done a better job of selling than the older producing districts. But even these areas will have increased difficulties in the future because of the higher freight rates which now prevail and which are likely to continue for some time. These increased costs will be an additional problem to them, but will be an added advantage to producers located closer to market if they have the business judgment to make the most of their opportunity.

Instead of criticising the success of the more distant areas, those nearer to market should follow in their footsteps, because only through improved quality and aggressive merchandising in all parts of the country can the industry expect to solve its problems and end its present difficulties.

The retailer has an important place in this part of distribution. First, potatoes embrace about 18.5 per cent of his total volume of produce sales in dollars. Most retailers are anxious to increase their total sales. But when we complain about the small sizes and cull potatoes which too frequently are found in the grocer's potato bin, we must remember that some one failed to grade these out at shipping point, placed them in a sack, and started them on their way to market. Although he may have thought that he gained on the transaction individually, the whole industry actually lost because those potatoes became a barrier to increased sales within the channels of retail distribution. Certainly the grocer should have removed such unsalable merchandise from display, but if the shipper had done so in the first place, the retailer would not have had the problem. Thus, aggressive merchandising is a joint operation that begins with the production of the right kind of potatoes and ends with a consumer who is well enough satisfied with quality so that she will ask for "more of the kind that I bought last time" and gets them. Only when that is the regular occurrence can the potato industry assume that it has done a good job. Even then it must continue to do so indefinitely.

Up to this time reference to the potato support program has been almost entirely omitted intentionally because that is not the primary subject which I have been asked to discuss. To do so adequately, would require much more time than is available. The Steagall support programs, as a whole, need no better recommendation than the fact that almost the entire world is looking to the United States for food. This tremendous increase in production could not have been achieved if farmers had been compelled to face the entire risk of market prices alone, remembering their experience after the First World War. With the government prepared to assist in absorbing the price risk, growers could concentrate their attention on production of the food products needed for war purposes.

But we must all recognize that such a program was to meet war needs, and is not suitable for peacetime conditions. However, if the United States is to adopt a national policy of abundant food production to assure consumers an adequate supply at all times, then the country must be prepared to protect producers against the price effects of an

oversupply when it occurs, as it inevitably will.

But fundamentally when a permanent support program is developed, it must be only a supporting part of the broader program to produce efficiently and distribute the potato supply to the American people. It will fail to achieve its purpose if it dominates the industry as has been the case in certain respects during recent years, especially after the end of hostilities. Insofar as possible, the many lessons which have been learned during the support period should be utilized in the development of any future long-time program.

Growers and dealers cannot look to a long-time support program as a panacea for all their ills. Nor can they expect such a support program to guarantee them a profit, especially in the face of a declining consumption of their product. Those districts which have been consistently selling the government from 20 to 50 per cent or more of their production are either growing too many potatoes, or the wrong varieties or need to give their marketing machinery a thorough overhauling, if they are to survive during the post-war period.

I know of no better way to close this discussion than to quote certain portions of the resolutions adopted by the American Farm Bureau Federation in Chicago last month which relate to this particular subject:

"We urge continued aggressive efforts to stimulate increased consumption of agricultural commodities through research, education, and improvements in production and marketing techniques; reduction in costs of production, processing and marketing; development of new and expanded outlets for agricultural commodities in domestic and foreign markets; diversion of surpluses into by-product uses; disposal of surpluses in export markets at competitive world prices, including the use of export payments when necessary; development and use of international commodity agreements and adequate wisely-planned, economically-administered programs designed to utilize a maximum of surplus agricultural commodities.

"We believe that every reasonable effort should be made to maintain adequate demand and consumption. However, when surpluses approach unmanageable proportions, it is imperative that farmers have adequate programs to control and adjust supplies so as to prevent the wrecking of farm prices, the destruction of farm purchasing power, and the resulting unbalanced economy.

* * * * *

"Due consideration should be given to providing sufficient flexibility in acreage adjustment programs to meet changing needs in production and consumption and to provide greater flexibility in adjusting individual production plans so as to facilitate efficient land use and not freeze acreage allotments in rigid historical patterns."

"The Farm Bureau has, through the years, fought for the principles and rights embodied in the existing permanent legislation. We do not intend to surrender these essential principles, yet we do recognize, in the light of past experience, the need for some changes in our long-time program. We favor a program based upon mandatory variable price supports for agricultural commodities. Such variable price supports should be applicable with or without quotas. The level of such supports should vary from 60 per cent to 90 per cent of parity, in accordance with the importance and peculiarity of the commodity and the supply and price position of the commodity. Sufficient flexibility should be provided to permit the producers of any commodity to have maximum authority to determine the level of the support price of their particular commodity and the utilization of the marketing quota features of the program.

* * * * *

"In previous resolutions we have recognized the need for modernizing the parity formula to take into account changes in production efficiency and demand that have occurred among the various agricultural products since the original base period. Until such time as something that is clearly superior has been developed, we favor the retention of the present parity formula with adjustments among the various agricultural products according to the price relationships which existed between the various products on the basis of a ten-year moving average. Should efforts to make this change be unsuccessful, the Farm Bureau will continue to work for the best solution possible of the problem of evolving an effective parity as a formula expressing a fair exchange value for farm commodities. In making the transition from the present to the modernized parity formula, the parity price of a commodity should not be lowered by more than five per cent in any one year.

"If, as a result of the application of the above procedure, the parity price for any commodity is out of line with the parity prices for other agricultural commodities, the Secretary of Agriculture shall adjust the parity price for the commodity in question in such manner as to reflect a purchasing power that is in line with that of other agricultural commodities. The Secretary shall, either upon his own initiative or upon request of a substantial number of interested producers, hold open hearings in which evidence will be presented, and within sixty days following the initiation of a hearing the Secretary must announce his decision pertaining to a revised parity for the commodity in question."

CURRENT POTATO RESEARCH IN NORTH AMERICA

Report of Committee on Research²
Potato Association of America

E. V. HARDENBURG¹, *Cornell University, Ithaca, N. Y.*

Early in the life of this committee it was decided that to be of most value to the Association the committee should attempt to inventory and classify the various types of potato research projects now current throughout the United States and Canada. Accordingly no attempt was made to list projects already completed, published or about to be published. Rather it was felt that fairly complete information on work in progress would be mutually helpful to potato research workers in planning future projects provided and to the extent that such information is so classified as to indicate its real objective and scope.

Under date of the 22nd of October, 1947, a request for a list of current potato research projects was mailed to 46 states, 9 Canadian provinces, Alaska, Hawaii, the Dominion Department of Agriculture, and the U. S. Department of Agriculture. The response was prompt and generous. Replies were received from 35 states, 9 provinces, the Dominion Department of Agriculture, and the United States Department of Agriculture. This is a tribute to the spirit of cooperation which has been developing in recent years among research workers in these "Good Neighbor" countries.

In attempting to organize the vast number of research project titles into a useful report, the committee soon recognized the difficulties and limitations involved. Several titles lend themselves to cross indexing. However, for the sake of brevity, this has not been done. The reader is also asked to forgive whatever omissions appear obvious. Some of these can be excused on the basis of incomplete information; others are the fault of the committee. The following report is composed of such general headings as disease and insect control, breeding, seed, planting, fertilizer, varieties, irrigation, soil management, weed control, vine killers, hormone treatments, storage, cultural practices, quality, harvesting, and marketing. Under each of these general headings an attempt has been made to so sub-classify the subject-matter as to make it most useful.

¹Chairman.

²Published as Paper No. 295. Department of Vegetable Crops, Cornell University, Ithaca, N. Y. Other member of committee, Professor Ora Smith of same address.

BREEDING

Disease Resistance

Combining with quality—Indiana, Louisiana, Manitoba, Michigan, Minnesota, New York, Pennsylvania, Wisconsin

Early blight—Louisiana

Late blight—Louisiana, New York, Maine, Quebec, Manitoba, New Brunswick

Leaf roll—Maine

Mosaic—Louisiana, New Brunswick

Ring rot—Manitoba, Maine, Saskatchewan

Scab—Louisiana, Manitoba, New York, Quebec, New Brunswick, Saskatchewan, Wyoming, U. S. D. A. (Colorado)

Virus—New Brunswick

Early Maturity—U. S. D. A. (Colorado), Manitoba

Improved Varieties—Washington, Saskatchewan, U. S. D. A.

Inheritance of Tuber-set—Wyoming

Insect Resistance

General—Ohio

Aphis—New Brunswick

Regional Adaptation of Varieties—Louisiana, Saskatchewan

Undesignated—Iowa, Minnesota, North Carolina, North Dakota, Oregon

CULTIVATION

Method of Hilling—Ontario

DISEASES AND CONTROL

Black Leg—Minnesota

Bottle-neck Tubers—Idaho

Dusting vs. Spraying—Tennessee, Prince Edward Island

Early Blight Resistance—U. S. D. A. (Louisiana)

Effect of Dormancy-breaking Gases on Tuber-borne Diseases—California

Fusarium Wilt—Idaho, New York, Prince Edward Island

General Control—British Columbia, Indiana, Iowa, Ontario, Quebec, Virginia

Hair Sprout—Minnesota

Jelly-end Rot—Idaho

Late Blight—Alabama, Canadian Department of Agriculture, Massachusetts, Maine, New York, North Dakota, Prince Edward Island, Wisconsin

Light Greening—Idaho

Nematode—Canadian Department of Agriculture, New York, Oregon, Prince Edward Island

Net Necrosis—Alberta, California, Maine

New Fungicides—British Columbia, Delaware, New Jersey, New York, North Dakota, Pennsylvania, Prince Edward Island, Quebec, Ohio, Rhode Island, Tennessee, South Dakota, South Carolina, U. S. D. A. (Maine), Wyoming

Purple-top Wilt—Alberta, Canadian Department of Agriculture, Maine, Minnesota, North Dakota

Rhizoctonia—Alberta, Canadian Department of Agriculture.

Ring Rot—Alberta, Canadian Department of Agriculture, Idaho, Maine, Minnesota, Montana, New York, U. S. D. A., Wisconsin, Wyoming

Sand Rust—Missouri

Scab Control

Relation of aluminum to—Indiana

On high-lime muck—Iowa

Relation of soil chemicals to—U. S. D. A. (Beltsville)

General—Alberta, Maine, Michigan

Scab Resistance—Minnesota, New York, North Dakota, South Dakota, U. S. D. A. (Colo.), Wyoming

Seed Piece Decay—Idaho, New York, Rhode Island

Seed Treatment—Manitoba, Maine, North Dakota

Southern Bacterial Wilt—North Carolina

Types of Sprayer Nozzles—Quebec

Use of Ultra Violet Light in Detecting Virus—Colorado

Verticillium Wilt—Idaho, Prince Edward Island

Virus Disease Control—California, Canadian Department of Agriculture, Idaho, Manitoba, Maine, Michigan, Minnesota, New York, North Dakota, Oregon, Washington, Wisconsin, Wyoming

Virus x Control—New York, Oregon, U. S. D. A. (Maine)

Witches Broom—British Columbia, Canadian Department of Agriculture

"Z" Disease—Michigan

FERTILIZER

Fertility Status of Fields—Rhode Island

Minor Elements

Aluminum and calcium—Rhode Island

- General study—Colorado, South Dakota
- Magnesium and boron—Ontario
- Magnesium deficiency—Canadian Department of Agriculture, Prince Edward Island
- Magnesium and potassium—New York, South Carolina
- Sources of magnesium oxide—New Jersey
- Sulfur deficiency—Idaho

Nutritional Requirements—Major Elements

- Analysis, ratio and formula studies—Colorado, California, Missouri, Pennsylvania, Virginia
- Calcium Requirements*—North Carolina, Ontario, New Brunswick, Prince Edward Island
- Levels of Phosphorus—New Jersey
- Nitrogen and Phosphorus Ratio—Montana
- Nitrogen and Potash Ratio in Tissue—Kentucky
- N P and K Ratios with Tissue Analyses—Manitoba, Ontario, Quebec
- Potash Levels on Muck Soil—Quebec
- Placement*—California, Massachusetts, New Jersey, New York, Ontario, Pennsylvania, Quebec, Virginia, Wisconsin
- Rate of Application*—Alberta, New York, Ontario, Pennsylvania, Prince Edward Island, Tennessee, Wisconsin
- Relation of Soil O. M. to Fertilizer Response*—Montana
- Undesignated*—Alabama, Alberta, Delaware, Iowa (muck), Ohio, Oklahoma, Rhode Island, Texas

HARVESTING

- Improved Equipment*—Idaho, Maine, Michigan
- Machinery Studies*—Ontario
- Mechanical Injury*—Idaho

HORMONE TREATMENT

- Dusted on Cut Seed*—New York, U. S. D. A. (Colo.)
- Sprayed on Plant*—New York, U. S. D. A. (Colo.)

INSECTS AND CONTROL

- Aphids*—California, Maine, New Brunswick, New York, Ontario, Wisconsin
- Colorado Beetle*—Alberta, Prince Edward Island
- Flea Beetles*—British Columbia, New York, Prince Edward Island, Wisconsin, Wyoming

General—British Columbia, Indiana, Minnesota, New York, North Dakota, Ohio, Ontario, Quebec, U. S. D. A. (Colo.), Virginia

Hoppers—New York, Ontario, Wisconsin

New Insecticides—New Jersey, New York, Pennsylvania, Rhode Island, Quebec, Manitoba, Tennessee

Psyllids—Wyoming

Tuber Flea Beetle—British Columbia

White Grub—Ontario

Wireworms—Connecticut, New Jersey, New York, Ontario

IRRIGATION

Cost of Operation—Alabama, New York

Effect on Yield—New Jersey, New York, South Carolina

Effect on Use of Fertilizer—South Carolina

Furrow vs. Overhead—Montana

Relation to Seed Spacing—New Jersey

Relation to Use of Surface Mulch—Alabama

Undesignated—Alabama, California, Maine, Ohio, Oklahoma, Virginia

Use of Soil Tensiometer—U. S. D. A. (Colo.)

MARKETING

Consumer Packaging—California, Idaho, Maine, New York

Consumer Preference Studies—Colorado, Idaho, North Dakota, Wisconsin

Dehydration Studies—Iowa, Kansas, Maine, North Dakota, New York

Market Quality—Minnesota

Potato Flour Manufacture—North Dakota

Potato Granules Manufacture—Kansas

Shipping Studies—California, Canadian Department of Agriculture, Maine, U. S. D. A. (Beltsville)

Sizing Studies—Idaho

Undesignated—Iowa, Michigan, Minnesota, North Carolina, North Dakota

PLANTING

Depth—California

Seed Spacing—Tennessee

Time—California, Pennsylvania

QUALITY

Discoloration During Dehydration—Indiana

Effect of Fertilizer on Quality—Colorado, New York

Effect on Growth Conditions—Indiana (muck), Michigan, Minnesota, New York, Pennsylvania

Vitamin C Studies—Louisiana, Minnesota, New York, Wisconsin

SEED

Certified Seed Production Studies—Canadian Department of Agriculture, Minnesota

Effect of Chemical Treatment on Size and Set of Tubers—Maine, New York, U. S. D. A. (Colo.)

Effect of Early Harvest on Virus Control—U. S. D. A. (Maine)

Effect of Frost on Seed Value—Canadian Department of Agriculture

Effect of Nitrogen on Seed Value—Montana

Effect of Sprout Inhibitors on Seed Value—New York

Factors Affecting Tuber-set and Date of Maturity—U. S. D. A. (Maine)

Greening Seed—New York

Hormone Treatment of Cut-Seed—New York

Maintaining Stocks Free from X Virus—U. S. D. A. (Maine)

Regional Adaptation—Virginia

Treatment and Packaging of Potato Eyes—Alberta

Treatments to Protect Cut Sets—Alberta, California, New York

Virus Detection in Seed Tubers—U. S. D. A. (Colo.)

SOIL MANAGEMENT

Depth of Plowing—Prince Edward Island

Erosion Control Studies—Maine, Prince Edward Island

Rotation Studies—Iowa, New Brunswick, Nova Scotia, Ontario, Pennsylvania, Prince Edward Island, Quebec, Virginia

Soil Acidity Studies—Pennsylvania

Soil Improvement with Green Manures—Alabama, Maine, Ohio, Ontario

Soil Oxygen Supply—Ohio

Soil Type Studies—Iowa, Michigan, Ontario, Virginia

STORAGE

Effect of Containers on Storage Quality—New York, Ontario

Effect of Fertilizer on Storage Quality—Colorado

General Storage Studies—California, Maine, Michigan, U. S. D. A. (Beltsville)

Low Temperature Effects—Canadian Department of Agriculture, Ontario, Prince Edward Island

Pathological Changes in Storage—Minnesota

Sprout Inhibitors—California, Canadian Department of Agriculture, New Jersey, New York, Ontario

VARIETIES

Blight Resistance—Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan

Classification—U. S. D. A. (Maine)

Disease Resistance—Iowa, Ontario, South Carolina, Wyoming

Insect Resistance—Ohio, Ontario

Mosaic Resistance—New Brunswick, Nova Scotia, Ontario, Quebec

Psyllid Resistance—Wyoming

Quality Studies—Minnesota, New York, South Carolina

Ring Rot Resistance—Wyoming

Scab Resistance—Alberta, British Columbia, Manitoba, Massachusetts, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec

Storage Quality—Louisiana

Undesignated—Oklahoma

Virus Resistance—Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan

Yield—Alberta, British Columbia, California, Delaware, Idaho, Iowa, Manitoba, Maryland, Maine, Mississippi, New Brunswick, New Jersey, Nova Scotia, New York, Ontario, Rhode Island, Saskatchewan, South Carolina, Tennessee, Texas, U. S. D. A. (Colo.), Virginia, Wyoming

VINE KILLERS

Effectiveness of Chemicals and Flame—British Columbia, California, Colorado, Maine, New York, North Dakota, Ontario, Prince Edward Island, South Dakota, U. S. D. A. (Colo.)

WEED KILLERS

Effectiveness of Chemicals and Flame—Michigan, New York, Ontario, Pennsylvania, Rhode Island

Tolerance to 2,4-D—Manitoba

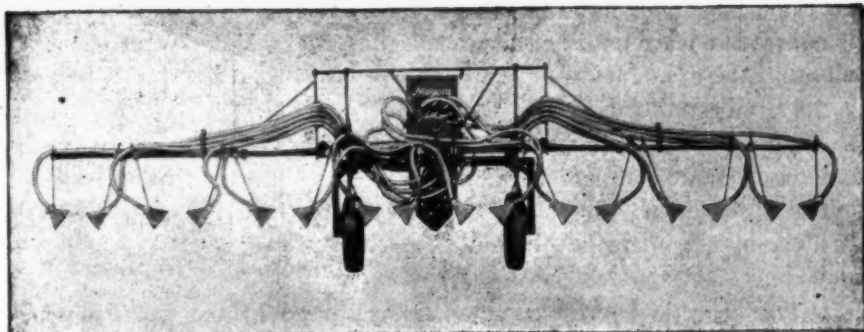
In summarizing this report, some reference should be made as to which of the 17 general potato projects are currently being most extensively studied. The number of phases of each project and the corresponding number of states and provinces involved with them are shown in the following table:

Project	Number of Phases Being Investigated	Number of States and Provinces Involved
Breeding	14	21
Cultivation	1	1
Disease control	30	38
Fertilizer	19	32
Harvesting	3	4
Hormone treatment	2	2
Insect control	10	23
Irrigation	8	11
Marketing	9	13
Planting	3	3
Quality	4	9
Seed	14	10
Soil management	7	12
Storage	6	11
Variety tests	13	29
Vine killing	1	10
Weed killing	2	6

Disease and insect investigations, the breeding and testing of new varieties and fertilizer studies, although not new projects, still command far more time of our research workers than any others. Relatively little study is now being given to such phases as cultivation, planting, seed and harvest. Irrigation, storage and marketing are phases of the industry which seem to have pretty well maintained their average quota through recent years. Among the newer phases of potato research, which are currently receiving an increased amount of study, are hormone and other chemical treatment of seed and plant to increase tuber-set and yield, and to control sprouting in storage; also the use of chemicals and flame not only to control weeds but also to kill potato vines.

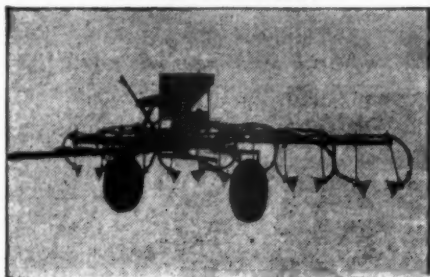
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SECTIONAL NOTES

ALABAMA

Alabama potato growers are very much confused and disgusted. After battling worse than normal odds with the weather, cost, and other factors, which finally resulted in a better than normal crop for size and quality, the Railroad strike has stopped shipment of potatoes just as we are getting started. Our conditions being what they are for the development of soil diseases makes a very serious condition. The strike is not to take place until next Tuesday, the 11th of May, but as of midnight on the 6th, shipments will be stopped so that delivery can be assured by the railroads.

Two years ago our growers remember what the strike did to some potatoes that were caught in transit as well as the ones that had to be left in the field. It is therefore our hope that something reasonable can be done or else there will be much loss to our growers. Trucks give some hopes but not enough.

The delay in harvest operations was caused by the fact that our crop matured somewhat later than last season. Refertilization and slower development of late blight, contributed to this later maturity. Our dealers agreed to let the crop mature for a longer period to prevent loss usually suffered in our early shipments.

The support program is very confusing here at this time. Our growers in general wanted assurance of support; our dealers could not see their way clear to sign up because of the guarantee demanded for delivery in grade. It seems that our dealers will handle the crop above support if possible, or leave it up to the support people to come through with something that they can work under. It is understood that they will give the B size back to the growers as soon as the price for them is below support.

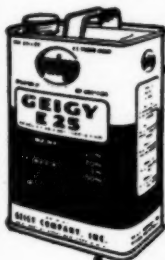
Our deal has been one of confusion the entire year. We still have hopes that things will work out better than it now seems possible. We have a good crop of potatoes with fair size and quality.—FRANK E. GARRETT.

CALIFORNIA

Kern County potato harvest is well underway at the present time. A total of 1,181 car loads has been shipped, primarily from the Edison district of Kern County as of the 28th of April. The yield from the fields in the earliest districts is not so high as in previous years because of the early frosts and continued cool weather during the spring months.

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—an emulsifiable solution containing 25% Geigy DDT (by weight) for use in the preparation of sprays for crop protection.



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A number of the packing sheds are now waxing the new potatoes. It is said that the market response to this process is enthusiastic.

In general the potatoes are of high quality and a minimum amount of scab or other diseased conditions appear. During the first week of May it is expected that several more areas will begin harvesting operations, and it is expected that by the end of May, harvest will be in full swing in all areas.—DAVID N. WRIGHT.

COLORADO

The San Luis Valley, an area on the upper Rio Grande river comprising five counties in the southern part of Colorado and lying between the Sangra de Cristo range and the continental divide, has started a new potato improvement program. This area like most other potato areas has had its troubles from potato diseases both in the field, in storage and in shipping. Also like other potato areas, the research answers to combat these problems have not come along fast enough under available facilities. Consequently, the San Luis Valley, with the aid of the San Luis Valley Potato Improvement Association and other organizations, took steps, last year, to increase these facilities by making use of the Marketing Agreement Act and the provision providing for the collection of fees for improvement purposes. Accordingly, hearings and referenda were held and the growers voted into effect a collection of one cent per hundred-weight on all potatoes sold in the San Luis Valley or shipped from the Valley. The Marketing Agreement Act is administered for the state of Colorado by the State Department of Agriculture and is administered locally by a Board of Control which consists of members elected from the area concerned.

The program got under way on the first of March, 1948. The San Luis Valley Potato Improvement Association made available a farm which they had leased for a number of years for research and improvement work and subsequently signed an agreement with the Board of Control to provide funds for research and improvement. Several new research and demonstration programs were under way. Considerable time and effort are being given to the study and control of Western Leak, a field and storage rot of potatoes. More effort is being given to the study of seed piece decay particularly on cut seed; also a study of the effect of hormones on potato yield and quality is being started; and the potato fertilizer studies are being enlarged to a certain extent.

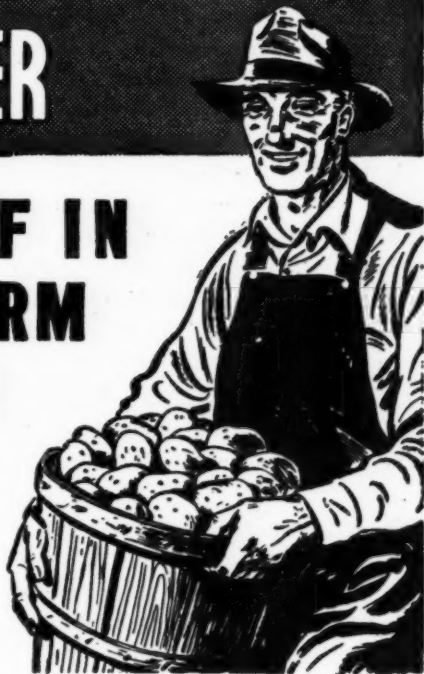
In addition, more demonstration work is being done in regard to fertilizers and diseases and insect control on farms throughout the Valley.

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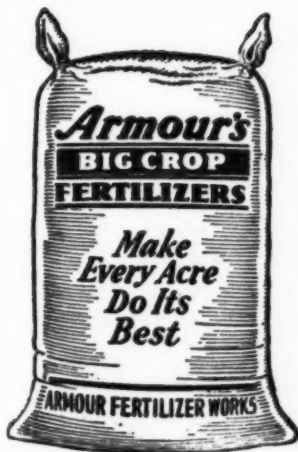
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Association and one each from the Colorado Extension Service and the Agricultural Experiment Station was established for the new program in the Valley. This committee supervises the expenditures of funds; recommends and approves new research and improvement work and manages the experimental and demonstration farm maintained in the Valley.—CECIL W. FRUTCHEY.

INDIANA

During the greater part of April and up to the present, we have had some wonderful weather for potato planting. Many of our growers have their acreage in, with the bulk of the planting being Irish Cobbler and Katahdin and the Sequoia seemingly is replacing the Chippewa as one of our good varieties. Many of our home gardeners and the small potato patch men, those having one acre or so, are very keen for Sequoia seed but evidently we are having a severe shortage of this variety for almost daily I get letters from people asking where they may obtain this seed. Our certified seed growers could possibly take advantage of this for, undoubtedly, many thousands of bushels could be sold, if properly marketed.

The acreage in Indiana will be about the same as it has been in years past. We will still have a shortage varying between five and six million bushels of potatoes for potato stock when fall comes and all the surrounding states to the east, west, and south of us are in the same predicament, so we consumers in Indiana spend and send to other potato-growing areas somewhere in the neighborhood of ten to twelve million dollars every year. We need more potato-minded people in this territory and yet we want to be very gracious to the growers in the northern areas who are limited to certain crops and cannot grow the wide varieties that can be grown in Indiana.—W. B. WARD.

MISSOURI

Last year, Missouri commercial potato growers planted 2,800 acres. The flood destroyed 800 acres and left 2,000 acres for harvest. This year they planted only 2,500 acres. The majority of the acreage is Irish Cobbler. However, Red Warba is growing in popularity, and it ranks fairly high in our acreage.

Some of the northern-grown certified seed potatoes shipped into this area this spring showed an internal brown ring. This browning of the vascular tissue had resulted from the destruction of the potato top by use of a burner before harvest. However, the seed was perfectly good in all other respects, and a very satisfactory stand was obtained.—ALLEN PURDY.

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NEW JERSEY

The potato crop was practically all planted by the 1st of May. Most of the plants have now emerged and some fields are being sprayed. Flea beetles are quite abundant in many locations and DDT is being used to control them.

Considerable interest has been shown in airplane dusting and many growers have contracted with operators of airplane dusters to dust their fields throughout the season.

No blight is present in our fields as yet but growers are, in general, ready to control any outbreak. The heavy rains of the past week have prevented some growers from spraying or cultivating so that flea beetles and weeds are causing these growers a great deal of concern. The rains have also caused some growers, whose plantings are on sandy loams, to consider side-dressing their potatoes with extra fertilizer. Nitrogen and potash, the elements most needed, are not very plentiful, but it is believed that enough is available to take care of any normal demand.

The Annual Summer Meeting of the New Jersey State Potato Association will be held on the 15th of June on the farm of Mr. Spencer Perrine at Cranbury. Prominent speakers are being secured to discuss current potato problems on production and marketing. A large exhibit of farm machinery will be displayed and demonstrations of aircraft dusting *vs.* ground dusting will be featured. Investigators at the Experiment Station have a fertilizer broadcast experiment, a variety test including 40 potato varieties or strains of varieties, and a weed control experiment located on this farm, and all growers desiring to inspect them may do so.

This announcement is your invitation to attend. Forsgate Airpark, located $\frac{1}{2}$ mile from the farm, has excellent facilities for handling planes of those interested in flying to the meeting. Arrangements may be made for free transportation to and from the Airpark by contacting the undersigned in care of New Jersey State Potato Association, New Brunswick, New Jersey.—JOHN C. CAMPBELL.

NEW YORK

Preliminary reports indicate that the acreage for New York State will be about normal. Long Island has already planted close to their allotment and up-state growers are probably going to be slightly under their allotment.

Table stock is pretty well cleaned up on available stocks and there will be no surplus; the same situation existing in the seed market. Prices range 30 cents above support at the present date.

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The Annual Summer meeting of the Empire State Potato Club will be held at the farms of J. W. Hopkins & Son and Irving N. Hopkins of Pittsford, New York, on Thursday, the 12th of August. This section is an intensive crop area in contrast to last year's location. Farm machinery manufacturers have already promised the Club their support in making this one of the best Field Days we have ever had.

The Winter meeting of the Empire State Potato Club and the New York State Vegetable Growers' Association will be held in Utica on the 5th, 6th and 7th of January. Committees have been appointed, who are active in arranging all details necessary for a successful convention.

Much interest is being shown in new machinery. Mechanical cutters have been very prevalent during the spring season. Also much interest is being shown in devices for handling potatoes both in bulk and packages.

One of the interesting items for the Summer Field Day will be the Roto-Beater which chops up the vines on short notice.—H. J. EVANS.

OREGON

An extremely wet spring has delayed farm planting. In general, most of the potato land is still too wet to plant. The average seeding will be late. However, we expect some increase in the certified seed acreage; which comprises Russets and White Rose. Increased eye-indexing studies will be undertaken, the eyes having been planted in south-central California early in January. This is in the nature of a demonstration and a number of growers are particularly interested in it. Eye-indexing may grow rapidly if this year's work is satisfactory.

Apparently, farmers are planting very close to their goals which will make a district increase in acreage of approximately 25 or 30 per cent, more than in 1947.—C. A. HENDERSON.

SOUTH CAROLINA

The rains which plagued South Carolina potato growers ceased about a month ago. Because of these excessive rains the crop varies from good stands to no stand at all, and from good growth to very poor growth. The rain that has fallen the past two days will be almost sufficient to finish the crop.

Late blight has been present for nearly a month. Some spores were disseminated during the rain that fell on the 15th of April, and caused some infection, but conditions have been unfavorable for the disease since that period. Most of the growers are using Copper DDT dust, although a few are using Dithane as a spray.

The crop should begin moving to market about the 24th of May and

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present prospects indicate one-half a normal crop. A large portion of the crop will be washed and shipped under refrigeration.—W. C. BARNES.

SOUTH DAKOTA

Potato planting is now underway in South Dakota at this writing, the 4th of May. The ground is in excellent condition with plenty of moisture. A number of carloads of foundation seed from North Dakota, Minnesota, Michigan and Wisconsin have been received by growers.

A marketing agreement has been approved for South Dakota and a meeting to select committee men will be held the first part of June. R. E. Keller from the Fruit and Vegetable Branch from Chicago will be in South Dakota for the meeting.

Tentative plans have been made to cooperate on the field inspection work with South Dakota State College this year. At present we are planning to secure a highly trained man to do field inspection work in the summer for the potato growers and research work for the College during the winter months.

Indications are that the acreage entered for certification will be as large or larger than the 6,350 acres entered in 1947. The 1947 crop is all cleaned up although it was necessary for the P. and M. A. to purchase 165 cars to support the price. Most of these were Cobblers.

There will be a fair acreage planted to LaSoda, the cross between Triumphs and Katahdin, which was made by Dr. Miller of Louisiana State. This is an early to medium-early variety, has a very bright pinkish red skin and has been a very good yielder.—JOHN NOONAN.

VIRGINIA

Weather conditions in the entire early commercial potato growing area of Virginia have been excellent so far. As we reported to you last month, we had no trouble with seed pieces rotting in the ground like North and South Carolina did, and as a result, we have almost a perfect stand. Rainfall has been abundant and fairly well distributed. The weather has been a little cooler than normal, under which young growing potatoes seem to thrive. Our shippers are estimating that if the favorable weather continues, Virginia will have about 15 per cent more potatoes this year than they had last year with approximately the same acreage. Of course, dry weather between now and the 15th of June could reduce the yield, but there is every likelihood that we will get two or three more nice rains between now and then.

The potato industry in other states will be interested in hearing about the results of the grower referendum in North Carolina and Virginia on our Southeastern States Potato Marketing Agreement. It

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is our understanding that these results will be announced from Washington in a day or so if they have not been already. We hear that 86 per cent of the growers in North Carolina favored the marketing agreement, and about 71 per cent of the growers in Virginia favored it. At the present time dealer sign-up under the agreement is being pushed by County P. and M. A. offices. Many of the larger volume potato dealers in the two-state area have already signed the agreement, and it is anticipated that more than 50 per cent of the dealers on a volume basis will sign it. As soon as the dealer sign-up drive is completed, and the results of both grower referendum and dealer sign-up have been presented to the Secretary of Agriculture, he will undoubtedly issue an order declaring the marketing agreement in effect for this year. Meetings of growers and handlers have been held in each of the six Districts of North Carolina and Virginia under the agreement for the purpose of electing dealer and grower nominees from which the Secretary of Agriculture will select members to the Administrative Committee which will operate the agreement. These lists of growers and handlers will be available to the Secretary for selecting committee members as soon as he approves the marketing agreement.

In the eastern potato section of Virginia our growers will have potato acreage quotas and a support price program on their fall crop for the first time this year. All of the principal potato-producing counties in the area have issued acreage quotas to growers for the fall crop. Although the acreage planted here for the fall crop is small, considerable interest has been indicated in this crop. Many growers feel they can now control late blight which is nearly always a factor here in our late crop, and perhaps more of a fall crop will be planted here in future years. In Virginia this crop is usually planted in July and harvested in late October or early November. Some growers report that they can get heavier yields than they can on their spring crop. Several of the larger growers have portable irrigation systems which they use on their fall potatoes.

The large new packing shed which will be operated this year by Mr. Guy Capps at Euclid, Virginia, near Kempsville, is about ready. There will be 6 washers and driers in this shed instead of 5 as previously reported. Mr. Capps will operate another washer and drier in Norfolk. The Euclid shed will wash and dry between 135 and 150 carloads of potatoes per day, operating on a 20-hour day. The Norfolk section of Virginia will probably be able to sell a large proportion of their potatoes on the commercial market as a result of this large washing and drying operation here as compared with the Eastern Shore of Virginia, which will have no washers and driers this year.

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The Department of Agriculture and the State and P. and M. A. office have held meetings with dealers and County P. and M. A. Committees in North Carolina and Virginia for the purpose of explaining this year's dealer contract under the price support program and for getting recommendations from the dealers on the charges which dealers are permitted to deduct from their returns to growers. The North Carolina dealers recommended the same charges as last year which were: 10 cents for hauling from field to grader; 13 cents for grading; 26 cents for new bags; 6 1/3 cents for loading on cars; 1 2/3 cents for inspection; and 6 cents for selling; or a total of 63 cents. This will probably be approved by Washington. Norfolk section of Virginia dealers have recommended 12 cents for hauling; 18 cents for grading; 23 cents for new bags (12 cents in case bags are used); 2 1/2 cents for loading in cars; 1 1/2 cents for inspection; and 6 cents for selling; making a total of 63 cents, the same as North Carolina. Eastern Shore of Virginia dealers are recommending a slightly higher charge for grading, sacks, and selling, but it remains to be seen whether the Department of Agriculture in Washington will approve the higher charges for the Eastern Shore than those recommended by the Norfolk section dealers. The Department may arrive at a compromise which allows Eastern Shore dealers a slight increase over Norfolk section and North Carolina dealers.—EDWIN W. CAKE.

WEST VIRGINIA

Most of the commercial potato plantings in West Virginia were planted between the 1st of April and the 1st of May—with Katahdins being the chief varieties planted.

The recent flood of the Ohio River did considerable damage to the Cobbler plantings in Wood and Mason Counties. Some of the growers are planning to replant.

The growers who are members of the West Virginia Potato Growers Association have ordered 190,000 peck bags. All the members of this association are using a similar brand. For the first time, all the potatoes packaged in bags adopted by the association will be inspected. This inspection will be done by a Federal-State inspector who will be employed by the State Department of Agriculture in cooperation with the Federal Inspection Service.—CLAUDE R. KEMPER.

ONTARIO

Potato market continues firm, with major supplies on farms about cleaned up, except for a number of small individual lots which may

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become available after planting has been completed. Planting of the early crop was finished about normal time, and conditions have been favorable for growth. On the 7th of May, some of the intermediate and late crops had already been planted. In other cases, preparations are being made, and it looks like as if the entire crop may be planted earlier than normal. It is difficult to predict acreages but many growers are talking about reduction, considering circumstances with respect to seed and labor. There has been a very definite shortage of Foundation seed of the Chippewa and Sebago varieties. Katahdin and Irish Cobbler have been in fair supply, and an increased number of growers will likely plant the Green Mountain variety this year.

Much interest is evident in the program of research being undertaken in connection with the ever-increasing menace of scab disease. Growers have already signified appreciation of Departmental efforts by contributing rather generously to supplement the \$10,000.00 allocated from this years' appropriation for an active concentrated, co-operative study of the situation.

Action is being taken on resolutions passed at the Annual Meeting, Ontario Crop Improvement Association, and favorable response is being received in a number of cases.

A scheme to regulate marketing under the Farm Products Control Act for early potatoes in South Western Ontario is under way.—R. E. GOODWIN.

CANADA

Canada has exported more certified seed potatoes up to the 31st of March than had ever been exported in a full crop year previously.

There were 3,489 bushels exported from the 1944 crop. This was a previous record. Up to March 31, 1948, there were 4,056,827 bushels shipped from the 1947 crop.

Shipments were made to 19 countries, but the United States and Argentina took more than 80 per cent of the total. The bulk of the shipments consisted of the Katahdin, Green Mountain, Irish Cobbler, Bliss Triumph and Sebago varieties. Prince Edward Island and New Brunswick supplied more than 90 per cent of the seed, but all other provinces with the exception of Quebec and Saskatchewan supplied substantial quantities. British Columbia shipped more than 51,000 bushels of White Rose to Argentina.—J. W. SCANNELL.

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